AASHTOWare BrM 5.2.3
Multi-Criteria Decision Analysis for Bridge Management
April 26, 2017
Mesa, Arizona
• Contact
• Multi-Criteria Decision Analysis
• Decision Alternatives in Bridge Management
• Bridge Management Criterion
• Utility
• Objectives
• Potential Utilization

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Multi-Criteria Decision Analysis

Multi-criteria decision analysis methods aid decision makers in logically reasoning through the advantages and disadvantages of decision alternatives.

- Saaty & Vargas, 2001
Decision Alternatives in Bridge Management

Factors that Effect the ‘Need for Work’

• Condition
• Functionality
• Risk
• Economics / Life Cycle Cost
Bridge Management Criterion

- Isolate items used to form a single rating or index
- Categorize them under distinct bridge management components
- Determine corresponding weighting factors

**Structural Condition** - measures the structural adequacy of a bridge

**Mobility** - evaluates how bridge attributes affect the traveling public

**Risk** - evaluates how bridge attributes and external factors affect the vulnerability of a bridge

**LCC** - evaluates the timing of when work occurs to provide the least cost over a given period of time.
Utility

Admin > Modeling Config > Utility

Components

- Total Utility
  - Condition
    - Weight: 40
    - Element ratings
      - Weight: 90
      - NBI ratings
        - Weight: 10
  - LifeCycle
    - Weight: 30
  - Mobility
    - Weight: 15
  - Risk
    - Weight: 15

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Utility – Structural Condition

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Utility - Mobility

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- Bridge Management Criterion
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Utility – Risk

- Contact
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Utility – Scaling

- Contact
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  - Utility
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Objectives

<table>
<thead>
<tr>
<th>Bridge</th>
<th>Utility</th>
<th>Condition</th>
<th>LCCA</th>
<th>Mobility</th>
<th>Risk</th>
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<td>Relative Weights</td>
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</tbody>
</table>

- Bridge A requires preservation work per agency policies
- Bridge B would not require work per agency policies
- Bridge C requires preservation work per agency policies
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